

1890

REPORT OF THE POMOLOGIST.

SIR: I have the honor to submit the following, which is my fifth annual report as Pomologist of this Department.

Very respectfully,

H. E. VAN DEMAN,
Pomologist.

Hon. J. M. RUSK,
Secretary.

THE FRUIT CROP.

The year 1890 was in many respects quite unusual as regards the fruit crop of this country. The winter of 1889-'90 was very mild and the early fruit buds were unusually forward. Along the Atlantic coast as far north as Maryland, New Jersey, and especially the Peninsula east of Chesapeake Bay, and westward to Kentucky (except the mountain regions of the Appalachian range), thence to southern Missouri and Indian Territory, the peach trees were beginning to bloom when the temperature suddenly fell lower than at any other time during the winter. In Georgia and the Gulf States the peach, plum, and early pear trees had set their fruit, and a tender growth of leaves and wood was quite well advanced. In Florida the orange and other citrus fruit trees were either in full bloom or just past that stage. Strawberries were ripening in the extreme south and everything promised a very early spring. On the nights of March 3 and again on the 16th and 17th of the same month there were severe frosts in the South, and farther north snow and ice and frozen ground, which made sad havoc with all the above named fruits; and even the apple and other late blooming species were so damaged in the bud that they failed to hold their fruit after setting it. The peach crop was an almost entire failure except in California, where a good crop was gathered. It was from this source that the eastern markets were almost entirely supplied with fruit the past year. A few peaches were grown in southern Kansas, Missouri, New Mexico, Arizona, Connecticut, and northern Michigan, and these brought a big price. This was owing to the freedom from severe cold in the South and to the fact that the buds in the northern regions were not sufficiently advanced to be injured by the cold weather of the early spring.

The pear crop was light all over the Eastern and Central States, but in California there was an abundance. Oregon and Washington also produced a good crop of pears.

The supply of small fruits and grapes was reasonably good. It is thought that the orange crop of Florida alone will reach 2,500,000 boxes. California orange-growers report a good crop for the coming spring, roughly estimated at 1,400,000 boxes, and Louisiana will market about the usual amount.

TRIPS OF INVESTIGATION.

During the year, as Pomologist, I have had occasion to visit in connection with official business the States of Connecticut, Maine, New Hampshire, Vermont, and North Carolina, and a record of observations then made on fruit culture in these sections should properly find a place in this report.

In the early part of June a trip was made to Connecticut for the purpose of examining into the peach-growing business. Near Meriden a large orchard was observed, but the larger number of the orchards were found on the highlands along the Connecticut River between Hartford and Middletown. One very large, flourishing orchard was located in the level land not far from the river. The climate is rather cool and the summers short for the perfect development of the peach, and the trees were consequently small, but they were healthy and had on a light crop of fruit. Last year there was a heavy crop on these orchards, and Hale Brothers, who are the largest growers in the State, sold \$25,000 worth of peaches. High culture is the secret of success, provided suitable soil and location have been selected, and this fact can be determined best by careful investigation on the ground and consultation with those who have succeeded. One of the chief points to be considered in connection with this industry is nearness to markets that afford a high price for peaches. A good crop of highly colored and delicious fruit marketed late in the season and free from bruises and decay will always bring good returns. All these things are possible in Connecticut.

In the latter part of July I attended a meeting of the State Horticultural Society of North Carolina, and a grape show at Mount Holly, which is in the southern central portion of the State. Owing to the damage by spring frosts there was little produced in the way of fruits in the central and eastern part of North Carolina, except grapes. Therefore the fruit exhibit was necessarily limited, and it was thought best to show only grapes. This exhibit was indeed very creditable, there being over fifty varieties of the very finest kinds commonly grown in the eastern United States. A large number of them were from the vicinity of Raleigh, and careful inquiry as well as close inspection of the samples proved that North Carolina is well adapted to the growth of this fruit. Since the vineyards of the central and eastern parts of the State ripen their fruit as early in the season as July, the growers are enabled to send them to market before the more northern States can possibly market theirs, and therefore the prices are high. The grape crop is generally considered remunerative by the practical vineyardists in North Carolina, where the growth of this fruit is being rapidly extended.

The principal purpose of my visit was to examine the condition of fruit culture in the mountain regions which comprise a large portion of the western part of the State. I saw but little of eastern Tennessee, which is practically the same in climate, soil, etc., as western North Carolina. Passing from Johnson City, Tennessee, which is in the great valley lying between the Blue Ridge on the east and the Cumberland Mountains on the west, to Cranberry, which is at the eastern terminus of the narrow-gauge railroad that runs into the mountains and just across the State line to North Carolina, I traveled thence by private conveyance, stopping wherever anything of interest could be found, to Lenoir, which is about

50 miles eastward and on the edge of the level lands which stretch to the Atlantic Ocean. I then traveled south and westward by rail to Waynesville, in Buncombe County, which has an altitude of about 3,000 feet. Here I visited the most comprehensive experimental orchards in western North Carolina, so far as I could learn of their existence, and found in a flourishing condition almost every species of fruit commonly grown in the eastern United States. The apple is the leading fruit of this mountain region, and I have seen no place in the United States where soil and climate are better adapted to the production of winter apples. Summer rains are usually abundant and drouths very rare. The soil is a mixture of shale, decomposed granite, mica-schist, and an abundance of decayed vegetation. The temperature is very much cooler than might be supposed for that latitude. The conformation of the land is very rough and the soil is incumbered with rocks, but there are narrow valleys and mountain slopes, commonly called "coves," which can be cultivated with ordinary ease. The experience of those who have been growing the apple in that region for twenty years and more goes to prove that the most successful apple region there lies between an elevation of 1,500 and 3,500 feet above the sea level. Where experiments have been attempted at higher altitudes the climate has proved to be too cool for the proper development of the apple. Although the trees grow reasonably well, the fruit is rather small and inferior in flavor. It might be proper to state in this connection that the native growth in these high altitudes is in some respects similar to that of northern New England, the yellow and black birch being quite common, and also black spruce and balsam fir on the highest peaks.

The peach is cultivated in North Carolina very successfully until an altitude of about 2,000 feet is reached, where the climate becomes too cool. The pear also succeeds very well in the eastern and central parts of the State as well as in the mountain region of the western part, where the apple flourishes so remarkably. I have never seen thriftier pear trees than in the vicinity of Asheville and Waynesville, where numerous experiments have been tried. The fruit produced is of the finest quality and fully equal to that grown in the Northern States. The quince seems especially adapted to the cool, moist climate and rich soils of the mountains, and no more profitable fruit can be planted there. The varieties of both native and foreign plums are successful, and although the ravages of the curculio were evident, yet there appeared no reason why with proper care the cultivation of this fruit should not prove profitable. In the mountain regions the commonly cultivated varieties of the grape flourish, but the fruit is very much later in season than that grown 50 or even 25 miles to the eastward. In fact the Catawba does not ripen earlier than the same variety in western New York.

Small fruits of all kinds seem to grow in greatest luxuriance. Nearly all the choice varieties of the blackberry and also many of the raspberries, both red and black, grow in abundance. The strawberry seems peculiarly adapted to the moist climate of the mountain, and although the fruit was out of season at the time of my visit the plants seen gave evidence that this fruit when cultivated yields abundantly. The currant and the gooseberry, which usually fail in the South, succeed in the higher altitudes of the mountains. After spending several days in the vicinity of Waynesville and Asheville I traveled through the country by private conveyance north and east-

ward to Linville, in Mitchell County, and thence to the railroad at Cranberry. I examined fruits of all kinds, as far as they had been tested, in every altitude, and found soil and climate well adapted to the growth of most species. Means of transportation is one of the great questions in that country, but railroads are being projected and in several places are being built across the mountains, and the time is not far distant when there will be ready means of shipment. The home market will be good, as there are already many summer resorts established in this locality and it is certain that more will follow.

In the early part of September I went to Lewiston, Maine, where the State Pomological Society held an exhibition of fruits in connection with the fair at that place. Although the season was a very unfavorable one for the growth of fruit, being cool and rainy, yet I found a very creditable exhibition of apples, pears, grapes, and plums, and a few quinces and peaches. The varieties represented were such as are grown in the apple-growing regions of the country, but of course they were not so far advanced in maturity as would be found in the Southern States. The fruit was usually very highly-colored and attractive in appearance, and in quality fully equal to that tested in other places. It is evident that Maine is well adapted to the growth of many kinds of our popular fruits. The apples are of such a character that they will keep very late in the spring and even into the next summer. The nearness of the State to markets, both domestic and foreign, gives abundant opportunities to the grower to sell at advantageous prices. Specimens were examined at this exhibition from nearly every county in the State. It was quite surprising to see the great display from Aroostook County, which is in the northeast, where it might be expected that apple and pear trees would scarcely be able to endure the winters. The plum seems quite well adapted to this State, especially to the southern part, and although the curculio makes considerable ravages upon it, still there is no great difficulty in producing a reasonable crop even of the choicer varieties of *Prunus domestica*.

From Maine I passed westward through New Hampshire to Newport, Vermont, which is within 5 miles of the Canada line and at the southern end of Lake Memphremagog. At this place is located the fruit farm of Dr. T. H. Hoskins, who is one of the most careful experimenters in fruit growing in all New England. He has tried almost every kind of fruit that would be at all likely to produce successfully so far north, and an examination of his orchards was exceedingly interesting. It is a notable fact that this year, when nearly all of the orchard fruits, especially the apple, have failed to produce even a small crop in a large part of the country, as has already been stated in this report, that the apple orchard of Dr. Hoskins was found loaded with fruit. A number of trees of Yellow Transparent, which is one of the best of the Russian apples, had been fairly loaded, as the trees gave evidence and as Dr. Hoskins stated to me, but, being out of season, the fruit had all been gathered before the time of my visit. The Wealthy, which is a seedling originated by Peter M. Gideon, of Minnesota, is among the varieties which seem to be most profitable. The trees were loaded with all they could hold of very handsome apples of fair size and quality. Scott's Winter, a native seedling of New England, although rather small in size, was abundantly loaded. This is a variety which keeps well through the winter, and the tree is as hardy as any other variety,

either native or foreign, yet tested. McMahon's White, a seedling of Wisconsin origin, was one of the most promising varieties in his orchard. Although the trees were quite young and only just beginning to bear, they were well loaded with fruit of large size and of very delicate flavor and attractive appearance. Switzer, which is one of the Russian varieties elsewhere described in this report, is of much value. The trees were loaded and the fruit was of good size and appearance.

The trees of Prolific Sweeting were heavily loaded with fruit of fair size and of a delicate, pale yellow color. Its quality is quite good, and when baked it is an excellent substitute for Tallman Sweet, which is well known as one of the best for this purpose. It is, however, only a fall apple, being past its prime at the time of my visit.

Zuzoff's Winter appeared well in the orchard, and the fruit is not only of rather large size but its bright red color makes it very attractive. It may be a popular market apple for the extreme North. How long it will keep is unknown, but I thought it of about the season of Wealthy.

Trees of Oldenberg were well loaded, and a more attractive orchard view could rarely be found than these trees in full fruiting. Dr. Hoskins was preparing for shipment 50 barrels of this variety, for which he received a good price, and there were plenty more left in the orchard. Besides these varieties there were many more just beginning to bear which gave promise of good success.

As to other fruits I saw many which seemed well suited to that climate. The strawberry grows luxuriantly and the same is true of the currant and gooseberry.

Of all varieties of the currant Fay seems to be the best for that locality and it yields a very large profit.

Of the cherries there were found in healthy condition a number of the lately introduced Russian kinds, but the trees were not old enough to bear. From what I know of these elsewhere I am led to believe that there is much to expect from them for the extreme North and it may be for the whole country.

Some of the Russian plums were quite promising and certainly the trees are quite hardy even in that cold climate. Several of our native varieties seemed equally hardy. It was a surprise to me to find so many kinds of our cultivated grapes bearing and ripening so well so far north. However, those ripening early seemed to be the best suited to the short summer season. All in all there is no doubt that fruit growing in northern New England is far from a failure.

DISTRIBUTION OF SEEDS, PLANTS, AND SCIONS OF FRUITS.

Through the continued courtesy of the Department of State, and the intelligent efforts of the United States consular officers in foreign countries, I have been enabled to secure a few rare and valuable varieties of fruit. A number of our correspondents have also kindly donated seeds, plants, and scions of choice fruits of native origin, all of which have been distributed for testing where they seemed most likely to succeed. The most important are as follows:

AVACADO PEAR (*Persica gratissima*).—The "Aguacate" of Mexico, Central America, and the Spanish West Indies. A pear-shaped, tropical fruit, with a large solitary seed. Flesh very rich, of the consistency of butter, and resembling beef marrow in

flavor. Excellent as a salad base, or with pepper and salt upon bread. From Lake Worth, Florida.

SUGAR APPLE OR SWEET SOP (*Anona squamosa*).—Seeds received from several points in southern Florida.

SOUR SOP (*Anona muricata*).—One of the most tender and beautiful of the anonas. Its acid flesh is quite a luxury in tropical countries. Seeds obtained from Palm Beach and Lake Worth, Florida.

SAPODILLA (*Achras sapota*).—Illustrated and described in my last annual report. Seeds from south Florida.

MEXICAN GUAVA (*Psidium lucidum*).—Grown in Florida as "Yellow Cattley."

DOWNTY MYRTLE (*Myrsus tomentosus*).—Highly ornamental semitropical shrub, bearing a pleasant flavored berry-like fruit.

OREGON ELDER (*Sambucus glauca*).—An excellent and very prolific elderberry from the mountains of Oregon and northern California. Possibly valuable to hybridize.

APPLE.—A limited number of scions of the following varieties have been distributed to various experimenters for trial: Arkansas Black, Benton, Hatley, Shiawasse, and Shirk.

PLUM (*Burbank*).—A few trees and scions were sent out for testing through the courtesy of the originator, Luther Burbank, of Santa Rosa, California.

CAPRI FIG.—With a view to settling the vexed question of the caprification of the fig of commerce, cuttings of the genuine wild capri fig were imported from Smyrna and distributed to a number of correspondents interested in the subject. All arrived in excellent condition, a few even retaining and maturing fruit which had set before shipment. These immature fruits all contained the insect *Blastophaga peenes* encysted, but the lack of a proper host plant caused their loss when the fruit ripened. However, the Entomologist purposed to import this insect when these plants have become well established in order to further investigate the subject. While this experiment may prove the fallacy of the theory of caprification (fertilization of fig blossoms supposed to be effected by pollen carried by insects) as affecting the flavor of the fruit, its success may also prove of incalculable value to the fig industry of the Pacific Slope and the Southwest.

PERSIAN PEACH PITS.—As suggested in my last annual report, efforts have been made to secure seeds of the peaches of Persia, Turkestan, and Bokhara, in the hope of introducing a valuable new strain. Early in the season a few pits were received from Minister E. Spencer Pratt, at Teheran, and immediately distributed. At the end of the coming season a much larger quantity of fresh seed is expected.

GOOSEBERRY.—A very few plants of an excellent seedling originated by Philip Strubler, of Naperville, Illinois, were distributed.

MANGO.—A number of plants of the celebrated No. 11 mango of Jamaica, and a quantity of fresh seed, were secured through the Royal Botanic Gardens at Kingston, Jamaica, and placed in the hands of reliable persons for propagation. Rear-Admiral Ammen, U. S. Navy, also presented to this Department three seedlings of a choice variety.

FIG.—Through the courtesy of Mr. William Saunders, Superintendent of Gardens and Grounds, of this Department, I have been able to distribute cuttings of the following varieties of the fig, obtained through commercial channels: Bianco Preoco, Prolifero, Natalino, Dattato. A Fruttini Nero, Di Napoli tivano, Lordajalo, Trojano, Sanvito, White Brogiotto, Black Brogiotto, Rubado, San Piero, Brianzola, Guigliona, Dalmatino, Smyrna (?), Black Dattato.

CITRON.—During the year, two hundred and seventy-five citron trees, embracing eleven varieties, were procured through the Department of State and placed in the hands of reliable experimenters in Florida and California. It is believed that these shipments include the choicest varieties of the citron cultivated in Italy and Sicily. They are as follows: From Naples, Sorrento, Calabria, Amalphi; from Palermo, Pomo d' Adamo, Macrocarpa, Icompio, Pereltone, Citrus Medica; from Catania, Cedro Vero, Testi di Turco, Pereltone, Limonziana. No descriptions were sent, but there is every reason to believe that in due time there will be produced within the United States the entire amount of prepared citron now imported.

PERSIAN GRAPEVINES.—In my last annual report mention was made of an effort to procure cuttings of the choice named Persian grapes, and I now take pleasure in stating that two hundred and thirty-two plants, embracing eleven varieties, were propagated by this Department from imported cuttings and distributed to points in California, Arizona, New Mexico, Texas, and Florida, where they are now doing well. The thanks of this Department are due Hon. E. Spencer Pratt, United States minister at Teheran, for the lively interest and great care he has displayed in this matter. The renown of the Persian grapes is so great that the value of this importation is beyond question. The varieties are as follows: Alhakhee, red, keeps

to middle of March; Askaree, good for raisins; White Shahanee, good winter grape; Black Shahanee, especially for wine; Chavooshee, green, rare; Hutab, large sweet; Dizmar, very sweet, yellow; Khaliliee, early, first ripe; Paykanee, good winter; Rish Baba and Shiraz, both of very finest quality.

THE DATE.—As a result of the steps taken last year looking toward the introduction into the United States of the choice cultivated varieties of the date grown in Egypt and Algeria, I now take pleasure in reporting that eleven named varieties, three from Algeria and eight from Egypt, have arrived in excellent condition, and after careful disinfection by the Entomologist, are now growing well at several points in California, Arizona, and New Mexico. The interest which this importation has occasioned may be taken as a fair index to the importance of the subject. This office has been besieged with applications for rooted suckers, although not a single plant was kept here. Information regarding date culture, the prospect of success, value of the crop, etc., was eagerly sought after by the public press and widely copied in the southwest; and the Southern Pacific Railroad Company kindly granted free transportation over its lines for the carload of plants. As usual with the plants we have imported, this Department retains control of the progeny as long as any necessity for free distribution remains, the recipient of the original tree merely acting as trustee. By this method any attempt on the part of a nurseryman to create a "corner" in any variety of our introduction is prevented, and to this Department is secured the credit of introduction and the privilege of free distribution as long as is necessary to assure success or thorough trial. In the case of these date trees, however, it must be a number of years before sufficient suckers are grown to warrant a general distribution, and applications for plants will not be considered until the original trees bear and their fruit has been tested. Only the choicest varieties will then be propagated extensively. To Las Cruces, New Mexico; Yuma, Arizona; and Tulare, California, the following varieties were sent: Amhat, Nakleh-el-Pasha, Seewah, Hazaneh, Zeb-el-Aled, Sultaneh, Amreeyeh, Rasheedeh, Deglet Nour, Rars, M'Kentichi-Degla; and to Phoenix (Arizona) National City and Pomona (California) the following: Amhat, Nakleh-el-Pasha, Seewah, Hazaneh, Yeb-el-Aled, Sultaneh, Amreeyeh, and Rasheedeh. A male tree was sent with each lot. Among the plants sent to National City, California, the Amreeyeh, Hazaneh, Seewah, Rasheedeh, and male were double, and in order to still more widely distribute these varieties, one plant of each was separated and turned over to the Southern Pacific Railroad Company for planting at Indio, in the valley of the Colorado.

NUT CULTURE.

During this year a circular on this subject has been addressed to a large number of correspondents calling for a statement of their experience and observation with both wild and cultivated nuts of all kinds. It has been responded to very generally, and a special report is now being prepared which will contain the information thus gained, together with that which is already known by the Division on the subject. In advance of this report I may say that there is a large part of our country suitable to the culture of several kinds of nuts; and already the chestnut, pecan, Madeira nut, and almond are being planted. The industry is only now well started. We annually import large quantities of almonds, Madeira nuts, and filberts; and there are no climatic reasons why all that our markets need may not be grown at home. The two former are grown in California for the market to some extent. One grower has about 1,000 acres planted to the almond alone. The filbert is not grown here, except an occasional plant; but there is good reason to believe that it will flourish, especially in the Puget Sound region, and I am taking steps to have the trial made.

• THE PECAN.

The *Hickoria pecan* is one of the best of all nuts, and is found wild only in North America. It abounds in the rich river and creek bottom lands of the Mississippi Valley, especially in Texas, Louisiana, Missis-

sippi, Indian Territory, Arkansas, and Missouri. Even as far north as southeastern Iowa it grows wild; but the region of profitable culture does not probably extend so far north as the other species of the hickory family. In the Gulf States is found the best climate for this nut, and already there are considerable orchards of it planted there. It is needless to expect success in poor soil, for like all nut trees the pecan grows to the greatest perfection in rich, moist alluvium. Many of the lands subject to periodical floods along the Mississippi River and tributary streams might be planted to the pecan with great profit. Once well established these orchards in rich bottoms would yield large quantities of the very best nuts, and would not be injured by the floods, which usually occur long before the time of gathering the crop. There is great variation in the nuts as to size, shape, thickness of shell, and quality of the kernel.

The illustration, Plate I, Fig. 1, shows the character of the ordinary wild nut; and Fig. 2, the large, choice, wild nuts sent to market. Fig. 3 is a very choice variety named Stuart, in honor of the originator, Col. W. R. Stuart, Ocean Springs, Mississippi. This is one of the largest and best in quality and thinnest shelled of any that I have yet examined. Fig. 4 represents another variety by the same originator, named Van Deman by him, as a compliment to myself. It is also very large, and thin shelled. Either of these varieties can be crushed in the hand.

Fig. 5 is a cut of a choice variety received from Louis Biediger, of Idlewild, Texas, and named Idlewild by me, as I thought it well worthy of propagation under a distinct name. A very choice variety is also shown in Fig. 6, which was obtained from E. E. Risien, of San Saba, Texas. Distinct differences will be noticed in the shape of the varieties, and these are only a few of a large number of choice kinds which have been sent to this office.

It is only just to mention that in addition to the above the following persons have large and delicious pecans, which it will pay any one who contemplates growing this nut to procure: T. V. Munson, Denison, Texas; O. D. Faust, Bamburg, South Carolina; B. M. Young, Morgan City, Louisiana; Arthur Brown, Bagdad, Florida. The illustration on Plate II is of a tree thirteen years old, on the farm of Col. W. R. Stuart, of Ocean Springs, Mississippi, and shows the typical size and shape of a pecan tree grown in the open field. It has been bearing for three years past.

THE CHESTNUT.

In my report last year I mentioned this nut and gave an illustration of Paragon, a chestnut which was brought to notice by H. M. Engle, of Marietta, Pennsylvania. I then thought it might be partly of foreign stock, and now am sure that it is nearly or entirely so. It is better in quality than the other varieties I have tested of either European or Asiatic parentage, but it is now quite well established that W. L. Shaffer, of Philadelphia, planted a European nut, from which the original tree of this variety came. The same may be said of a variety mentioned in my report of last year under the name Dupont, which is a Delaware seedling from a foreign nut. Recent investigations prove that its true name is Ridgley and that Dupont is only a synonym. There are a number of very large varieties of foreign chestnuts in the hands of Samuel C. Moon, of Morrisville, Pennsylvania, and William Parry, of Parry, New Jersey, who both sent me samples this year. It is, however, my belief that we should



Fig. 1. COMMON WILD PECAN.



Fig. 2. LARGE WILD PECAN.



Fig. 3. STUART.



Fig. 4. VAN DEMAN.



Fig. 5. IDLEWILD.



Fig. 6. RISKS.

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PECAN TREE, IN ORCHARD AT OCEAN SPRINGS, MISSISSIPPI.
Fourteen years from seed.

look chiefly to our native species for the choicest kinds, although not the largest.

During the investigations of this year there have been found a number of very large wild varieties and some very early in ripening. In due time they will all be brought to public notice and full information will be given about them.

THE ALMOND.

I only mention this nut to state to all experimenters that it is useless to try to grow the almond of commerce this side of the Rocky Mountains, except, possibly, in New Mexico and southwestern Texas. This is thoroughly established by many reports from those who have tried it in nearly every State and for many years past. It is too tender in the North and does not bear in the South. In California it is an eminent success.

The flavor of the hard-shelled almond, so far as I have tested it, is little or no better than a peach kernel, and is therefore practically worthless. The tree of this variety is about as hardy as the peach and bears quite freely. The attention paid to the almond in the Atlantic and Central States might well be given to other nuts.

PROPAGATION.

It is generally known that the trees of all the walnut, hickory, and chestnut families are hard to transplant, because of their deep taproots. While it is true that by proper treatment in the nursery they may be forced to develop branching roots, it is the surest way to plant the nuts where the trees are to stand. If transplanted at all the trees should be very young.

The variation of seedlings is so great that, with nuts as well as other fruits, the only sure method of reproducing a variety is by budding or grafting. This is a more difficult operation with nut-bearing trees than with most others. However, it can be done, and with each year we are learning better how to do it. In my annual report for 1888 something was said on this subject, but since then additional experience has furnished considerable knowledge.

At present the best known method is to work upon one or two year old seedlings, either in nursery rows or where seeds have been planted in the orchard. They should be cut some two or more inches below the surface of the ground, or just above where the roots begin to swell, and a scion inserted not less than 5 or 6 inches long and having a terminal bud if possible. The "tongue" graft is the best for small stocks. No wax is needed for this underground grafting, but some bandage should be used to hold the parts firmly in place. Cotton strips dipped in hot grafting-wax and then dried are very good. A ball of wet clay may be pressed about the wound and the earth packed to near the top of the scion to stop evaporation. A very important point and one that must not be overlooked is that the scions should be cut early, before any signs of starting, and put in some cool, damp place until after the stocks have begun to grow. In the sawdust of an ice-house is a safe place, or buried in earth where the sun will not warm it early; otherwise they are apt to start too early.

Mr. W. N. Irwin, of South Salem, Ohio, has succeeded in budding the black walnut by using scions so held back until the stocks peeled easily in the spring.

NATIVE FRUITS.**THE APPLE.**

For many years there has not been so great a failure of this most popular of all our fruits as during the past season. Missouri is the only State which had anything like a full crop. It is stated by the best authorities that the apple crop of Missouri this year brought the growers over \$10,000,000. Speculators and dealers made large profits after paying this large sum to the growers. In northwestern Missouri the crop was heaviest, cases being reported in which the apple crop alone brought more money than the entire orchards, including the land on which they stood, would have sold for last spring. Eastern Kansas had a fair crop and good prices were realized. F. Wellhouse & Son, of Leavenworth County, marketed from their own apple orchards over 79,000 bushels, and received \$3 per barrel at the railway depot for a large part of them. Eastern Nebraska, southern Iowa, northern Arkansas, and a few localities in Illinois had a fair apple crop. Oregon and Washington are becoming known as the apple country of the Pacific Slope. Orcas Island and other places where apple orchards have been planted in the Puget Sound region produced an abundant crop.

Besides these places there were almost no apples raised, except a few in Wisconsin, northern Michigan, northern New England, western North Carolina, the foot-hill regions of California, Colorado, and New Mexico.

There has perhaps been no other year since means of transportation became easy when winter apples brought so high a price in market as during the past season. At the close of the year, good apples were worth from \$6 to \$8 per barrel.

Experiments with new varieties are constantly bringing to light those which are worthy of general trial and enabling us to lay aside others less desirable. Among new varieties the following is deemed worthy of description and illustration:

Hatley.—Size medium, fruit being $2\frac{1}{2}$ inches in diameter; shape regular, oblate, conic, somewhat unequal, and oblique; surface neither smooth nor very rough; color yellow, nearly covered with bright and dark red splashed and striped with russet over gray; dots numerous, irregular, russet, prominent; basin medium, abrupt, regular, leather-cracked; eye closed; segments of calyx reflexed; cavity deep, abrupt, regular, green or russet striped; stem short to medium, slender; core pointed, small, closed, and clasping; seeds many, broad, plump, dark-brown; flesh yellow, fine-grained, tender, melting, juicy, and rich; flavor rich, aromatic; quality very good to best; season, November in Arkansas, and will probably be a good keeper northward. An excellent apple to eat from the hand.

Switzer.—Among the apples which have been imported from Russia this is one which seems to have good qualities for the extreme north. The tree is very hardy and not so subject to blight as some others. It bears abundantly. On Plate III is given a representation of a characteristic specimen which was grown by Dr. T. H. Hoskins, of Newport, Vermont. In size the fruit is medium, $2\frac{1}{2}$ by 3 inches; shape, round, conical, regular; surface, smooth; color brilliant crimson and purplish stripes and splashes over a whitish ground; handsome; dots medium light-gray, scattering; basin shallow, narrow, abrupt, ribbed; eye closed; calyx tube deep and wide; cavity wide, shallow, irregular; stem long, slender; core medium size, open; seeds numerous, plump, dark-brown; flesh white, tender, not heavy; flavor, quite tart; quality fair; season, November to December in Northern Vermont.

THE STRAWBERRY.

Of the early fruits of North America this stands clearly at the head. The crop of 1890 in the United States was rather abundant,



SWITZER



BANQUET

except in the South, where the severe cold spell near the first of March in many cases killed it entirely. In the North rains were too copious at picking time in a few sections, the fruit consequently being soft and poorly flavored, and in some cases rotting in the patch.

Great progress continues to be made in the production of new seedlings, and critical field tests of old and new varieties are constantly being conducted by private individuals and the Experiment Stations.

Wilson.—This variety has been prominent for some twenty-five years and is still quite popular for market. The theory of the "running out" of varieties by continual propagation has been in great measure refuted by actual experience with this famous sort. Mr. J. M. Smith, of Green Bay, Wisconsin, who is perhaps at the head of the market strawberry growers in this country, claims that this theory is a mistake, and that while others may prefer to grow newer kinds the Wilson pays him best of all and is fully as good every way as when it first came out. He thinks the cultivators neglect it and that all that it needs is thorough cultivation.

Crescent.—There is more fruit of this well-tried variety sent to our markets than of any other. It seems to do well almost everywhere. The plant is exceedingly vigorous and soon covers the ground if allowed to do so. Being imperfect in its flowers the planting of pollen-bearing varieties is necessary; but it will bear lightly without this provision, as the stamens are not entirely wanting. It is medium in size and conical in shape except in case of overgrown specimens. The color is scarlet and the flesh rather soft for long shipment. In flavor it is very good, but not as highly aromatic as some. With ordinary cultivation and another variety with perfect flowers near by (Cumberland is one of the best), no farmer need want for plenty of berries from the Crescent.

Bubach (pronounced Bu-baw).—Perhaps there is no other new variety at the present time which has so many good words said of it. It was originated by Mr. J. G. Bubach, of Princeton, Illinois, and by him was called his No. 5. It has been called Bubach's No. 5 by many persons to distinguish it from other varieties by the same originator bearing numbers instead of names. Sufficient trials of it have been made during about five years past to warrant reliable information concerning its merit; moreover, it has passed from the experiment grounds to the fields of the market grower. The plant is very robust and of hardy constitution. The flowers are wanting in stamens, and this imperfection makes necessary the adjacent planting of some perfect-flowered variety. However, this is not a serious objection, as the pollen is easily carried by insects and the wind from about every fifth row. The fruit is very large and inclined to be coxcombed in shape, which to my mind is an objection. The color is crimson and very attractive; the flesh dark, nearly to the center, and a cavity is found in very large specimens, but being firm the fruit ships well. The flavor is good but not of the highest quality. In season it is about medium. The yield of fruit under good cultivation is very heavy, and this characteristic added to its other good points makes it a very profitable variety in nearly all sections where the strawberry succeeds.

Banquet.—This variety originated with Mr. J. R. Hawkins, of Mountainville, Orange County, New York, and promises to be one of the coming strawberries for home gardens and the fancy market,

provided the plant succeeds as well generally as where already tried. In 1880 Mr. Hawkins had a strawberry bed upon a hillside which was the natural home of the wild species, and during the season some plants of Minor's Prolific made their way among the wild plants of *Fragaria Virginiana*, growing upon the unplowed portion of the land. From the fruit of some of the Minor growing nearest the wild plants, he raised thirty or forty seedlings, and one of these yielded fruit of such excellence that the originator gave it this appropriate name. The plant is very thrifty and the flowers are perfect. Size of fruit medium, 1 by $1\frac{1}{4}$ inches, and very uniform; shape conical, rather elongated, never coxcombed; color a rich dark crimson, without tendency to lose color when over ripe; flesh firm, coloring to the center and ripening equally in all parts; quality very good; flavor peculiarly rich and pleasing, possessing in a marked degree the aroma of the wild berry. The stems hold the fruit well up from the ground, resembling Crescent in this regard. In season it is about medium. While the fruit has been tested and pronounced excellent by a number of competent pomologists, the variety has never been placed upon the market. The originator preferred to test it fully and perhaps improve it by careful selection before offering plants for sale.

The illustration (see Plate IV) was made from one of many samples sent by Mr. Hawkins from his place in New York. It is not exaggerated in any respect. Of all the strawberries with which I am acquainted this is one of the very choicest in flavor and of general good qualities. I recommend it for extensive trial.

Parker Earle.—This is the name of a new strawberry, originated by Mr. J. Nimon, of Denison, Texas, and offered to the public by Prof. T. V. Munson of the same place. The plant is very vigorous and makes runners very freely. It is abundantly productive and seems well suited to the extremes of temperature which our country affords. The root system is excellent and the flowers perfect. It has been tried in a small way in many States and seems to meet with general favor. The fruit is not large, but fully large enough and of quite uniform size. Specimens rarely exceed $1\frac{1}{2}$ inches or fall below 1 inch in length. Its shape is decidedly conical, usually necked and regular in outline, not being coxcomb-shaped; color brilliant scarlet, but not dark, and evenly distributed; flesh firm and solid to the center, having no internal cavity. It is said to carry well to distant markets. Its flavor is mild and yet not lacking in high character. The name was given by Mr. Munson in honor of the president of the American Horticultural Society, and it is fitting that so good a fruit should be named for so distinguished a grower of strawberries.

THE GRAPE.

During this year the grape crop of the country was very heavy. In western New York there was an unusually large crop and the prices were fairly good. In a part of New Jersey the Rose Chafer (*Macroderctylus subspinosus*) almost ruined the crop by eating the flowers. The ravages of the black rot were generally kept in check by the copper solution remedies where they were used according to the directions of this Department. In California there was a most bountiful crop of grapes and very little damage by rains. The packing of raisins was larger than ever before and their quality was very good.



BRILLIANT.

Several new varieties of the grape were brought to notice during the year and among them is the following:

Brilliant.—This is a seedling originated by Prof. T. V. Munson, of Denison, Texas. The illustration, Plate V, is from a cluster sent to my office by him. It is the result of a carefully made cross between Lindley and Delaware, effected in 1883. It has been tested by a few of the best grape-growers in the country and proves hardy in vine. The growth is quite vigorous, and so far as can be judged it bears abundantly. The cluster is about the size and shape of the Concord, being compact and slightly shouldered. The berry is large and hangs well to the stem. The color is red, nearly resembling the Catawba. In flavor it is about equal to the Delaware, being delicate yet rich and aromatic. The pulp is very tender and the seeds seldom exceed two or three. The skin is thin, yet tough enough to ship well.

TROPICAL FRUITS.

THE PINEAPPLE.

It may not be generally known that this fruit is grown successfully in field culture within the United States. It is, however, limited to southern Florida, for not only does a slight frost seriously damage the plant but chilly air either day or night is injurious and dry air at any temperature is not suitable. Many persons think that any location where frost does not come will do for the pineapple and other tropical plants and trees, but this is far from true. In the extreme southern part of Texas and in many places in California it would succeed if the nights were as hot as the days and the air moist. A few partially successful attempts have been made in California. Even the central part of Florida does not seem so well suited to pineapple culture as the coast regions from Merritt's Island southward to Key West and northward from there to Tampa Bay, in which region there are hundreds of acres yielding this fruit abundantly. The islands seem especially favorable, as their foundation is usually coral rock upon which is a well-drained sandy soil mixed with decayed vegetable matter. Some persons think that thin sandy soil will do for this fruit, but although it may produce light crops, rich soil is much better. Key Largo, Plantation Key, and Pine Island are some of the most profitable places for pineapple culture in all Florida. At Biscayne Bay, on the east coast, are many fine plantations, and also on the shores of Lake Worth, which lies opposite the south end of Lake Okechobee. The illustration on Plate VI is from a photographic view taken at the place of Breisford Brothers at Palm Beach, which is a settlement on the strip of land lying between Lake Worth and the Atlantic Ocean.

Northward from this place lies the narrow sound which is known as Indian River, and for over 100 miles along its shores may be found patches of this fruit at the home of almost every settler. At Eden, which is on the mainland side, are some of the largest plantations in Florida. It is estimated that fully half a million fruits of marketable size were shipped from this place this year.

On Merritt's Island are also many commercial plantations, and it may be safely stated that this is the northern limit of the pineapple. It is true that all over the orange-growing region of Florida this tender fruit is occasionally grown under temporary protection, but not

otherwise except in a very few peculiar situations. Near Orlando there are some fields which are reported as paying well this year, and in 1889 I saw them growing under shelter at that place.

The plants do best set from 3 to 4 feet apart each way, although some growers set them closer. The hoe is the principal tool used in cultivating, but horse cultivators can be used to an advantage until the plants get too large. The edges of the leaves of nearly all varieties are armed with sharp teeth, which are quite annoying to man and beast.

A plantation will last about three years without renewal and bear good crops. The first year the young plants bear little or no fruit, but the second year each should have at least one good large one and the third year two or more, but there is usually a considerable proportion of small ones which are unmarketable if less than about 4 inches in diameter. It does not pay to grow small pineapples, and whoever attempts it should bear this in mind.

Propagation is always conducted by offshoots, which are of three kinds and known by the names "crowns," "sets," or "slips," and "suckers." The crown is that part which appears at the top of the fruit and consists of a single bud in the center of a cluster of leaves. Very small shoots called "crownlets" are sometimes found at their base. The slips or sets are found about the base of the fruit and although small are numerous and usually used for propagation. The suckers are branches which come out of the main stalk near the ground and come into bearing soonest of all. All the above root very easily. There are many named varieties, which differ in style of plant, and the fruit varies in size, shape, color, flavor, and time of ripening. Specimens have been sent to my office which weighed nearly 10 pounds, and I have heard of much larger ones. New varieties are produced from seeds as are other new fruits.

Queen.—This is one of the varieties about which there is considerable confusion as to name. In Florida it is called "Egyptian Queen" and also "Gypsy." It is of the very highest flavor and of a beautiful lemon-yellow color. No variety brings a higher price in market according to the experience of Florida growers. In shape it is rather elongated and in size is only medium.

Porto Rico.—This is grown to some extent but does not multiply rapidly. The plant is very large and thrifty and the leaves often attain a length of 5 feet. The fruit grows to the largest size and specimens weighing 10 pounds are not rare and some reach 20 pounds. The shape is pyramidal and the color a pale pinkish yellow when fully ripe. The protuberances are very large. The flavor is subacid, but to my taste not so rich as many other kinds.

Red Spanish is the variety which is generally grown in Florida. It is not large, as a fruit rarely weighs more than five pounds. The shape is almost globular and the color is a brownish yellow at maturity. The flavor is subacid, vinous, and very delicious when fully ripe.

SEMITROPICAL.

THE KAKI.

In my reports for three previous years mention has been made of the kaki or Japanese persimmon, the planting of which has steadily increased. There are single orchards in Florida of thousands of trees and the markets in the northern cities are beginning to receive the



PINEAPPLE FIELD AT LAKE WORTH, FLORIDA.
Second year after planting.

fruit. It ships with greatest safety, as it may be gathered when quite hard, and ripens gradually for several weeks afterward. There is no fruit better adapted to street selling, as it is attractive in color and ripens so gradually that very little need be lost by decay. The Japanese esteem it as their most popular fruit, and do not always wait until it fully ripens before eating it. When dried it resembles the fig, and thus prepared and afterwards cooked it is quite palatable. Eaten fresh with cream and a little sugar it is delicious. Investigations are being continued in order to obtain, if possible, from the northern parts of Japan and Corea varieties which may prove hardy in our central States. As yet, however, I only have information indicating that we may get such kinds, and promises that trees will be sent.

The severe cold last spring killed nearly all the blossoms of this fruit in Florida and in the other Southern States, and in many cases the trees were seriously damaged, consequently there has been almost no fruit this year, and no progress has been made since my report of last year in disentangling the confused nomenclature of the varieties. However, past experience will fully warrant the publication of the descriptions and illustrations of the two following varieties:

Zengi (pronounced Zen-gy).—This is one of the smallest varieties, averaging about $2\frac{1}{4}$ inches transverse diameter, although often not more than $1\frac{1}{2}$. Occasional specimens reach 3 inches. In shape it varies from distinctly oblong to globular, sometimes having a slight depression at the apex. Skin dull red with a yellowish cast, not as brilliant as the larger varieties, generally marked with black cracks about the point when well matured on the tree. Flesh rather stringy, dark, showing black dots and white fibers when cut transversely, and light colored fibers with broad splashes of brown when cut vertically. Usually quite seedy; flavor very good, seldom astringent even when hard. Very early and prolific. Plate VII was made from fruit sent by Mr. J. S. Wade, Homeland, Florida.

Tsuru.—Very long and slender (2 by $3\frac{1}{2}$ inches) as its name (*Tsuru*, a crane) indicates. Rather bright orange red, skin smooth with very little tendency to crack at point. Flesh orange colored, rather dry; seeds few, with correspondingly slight tendency to show brown markings; very astringent when unripe. Mainly valuable as a late keeper. Specimens ripened on the tree are rather broader at the base than when ripened off the tree. The illustration, Plate VIII, was taken from a specimen obtained from Mr. G. L. Taber, Glen St. Mary, Florida.

THE GOUMI.

The Goumi (pronounced goo-my), *Elaeagnus pungens*, from Japan, is a pretty red, gold-flecked berry, fairly pleasant for eating, and is likely to prove an addition to our gardens as an ornamental shrub as well as a fruit. Its hardiness has been partially tested, and the probabilities are that it will not prove sufficiently hardy for the Central States. The buffalo berry of the West is a member of the same genus. The fruit is eaten raw in Japan, or either pickled or preserved, and either way it is quite palatable. It is also valuable for jelly, resembling currant jelly to some extent. The fruit appears like an elongated pie-cherry, and averages one half to five eighths of an inch in size. Color bright red, surface appearing as if covered with small golden brown dots; stem long, one and one eighth inches;

slender, brown. Fruit slightly depressed at each end; acid and somewhat astringent until fully ripe, when it acquires a pleasant aromatic flavor. It ripens in midsummer. Wood bright brown, slender; buds small, brown, conical; leaves alternate, oval, acute, pointed, thin, light green above, silvery with brown dots below, both surfaces covered with stellate hairs. Grows freely on tolerably dry soil; reproduces closely from seed; a shrub about 6 feet high. The illustration on Plate IX was made from a specimen grown and sent to this office July, 1890, by Prof. T. V. Munson, Denison, Texas. It has also fruited with H. H. Berger & Co., of San Francisco, California.



ZENJI.

TSURU.





GOUMI. (Goo-my.)
(ELAEAGNUS PUNGENS.)

